

What is claimed is:

- 1 (1) A curable homogeneous blend comprising:
 - 2 (a) a 1,2-polybutadiene oligomer having a number average molecular weight
 - 3 (Mn) of about 500 Daltons to about 50,000 Daltons,
 - 4 (b) a bis-phenol-A derivative that is end-capped with acrylate functionality, and
 - 5 (c) a reactive component that has at least one terminal double bond and that
 - 6 enhances the compatibility between the 1,2-polybutadiene oligomer and
 - 7 the acrylated bis-phenol-A derivative.
- 1 (2) A curable blend according to Claim 1 wherein the 1,2-polybutadiene oligomer has
- 2 a number average molecular weight (Mn) of about 1,000 to about 5,000 Daltons.
- 1 (3) A curable blend according to Claim 1 wherein the 1,2-polybutadiene oligomer is a
- 2 butadiene homopolymer.
- 1 (4) A curable blend according to Claim 3 wherein the butadiene homopolymer contains
- 2 an amount of 1,4-polybutadiene.
- 1 (5) A curable blend according to Claim 4 wherein the 1,4-polybutadiene is present in
- 2 an amount up to about 60% by weight based on the weight of the butadiene
- 3 homopolymer.
- 1 (6) A curable blend according to Claim 1 wherein the 1,2-polybutadiene oligomer is a
- 2 copolymer.
- 1 (7) A curable blend according to Claim 6 wherein the 1,2-polybutadiene copolymer is
- 2 prepared from butadiene and a vinyl monomer that is a member selected from the
- 3 group consisting of: styrene, vinyl acetate, divinyl benzene, isoprene, chloroprene,

1 alkyl acrylates, alkyl methacrylates, ethylene, propylene, butylene and mixtures
2 thereof.

1 (8) A curable blend according to Claim 1 wherein the 1,2-polybutadiene oligomer is
2 present in the blend in an amount of about 5% to about 50% based on weight.

1 (9) A curable blend according to Claim 1 wherein the bis-phenol-A derivative is an
2 epoxy prepared from epichlorohydrin and bis-phenol-A.

1 (10) A curable blend according to Claim 1 wherein the bis-phenol-A derivative is
2 ethoxylated.

1 (11) A curable blend according to Claim 1 wherein the reactive component is an
2 aliphatic monofunctional or multifunctional acrylate or methacrylate.

3 (12) A curable blend according to Claim 11 wherein the acrylate or methacrylate is a
4 member selected from the group consisting of: isodecyl acrylate, lauryl acrylate,
5 lauryl methacrylate, nonyl phenyl acrylate, and dodecyl acrylate.

1 (13) A curable blend according to Claim 1 wherein the reactive component is a
2 polyoxyalkylene monofunctional or multifunctional acrylate or methacrylate.

1 (14) A curable blend according to Claim 13 wherein the polyoxyalkylene
2 monofunctional or multifunctional acrylate or methacrylate is a member selected
3 from the group consisting of: 2(2-ethoxyethoxy) ethyl acrylate, 2[2-(2-
4 ethoxyhexyloxy)ethoxy] ethyl acrylate, di(ethylene glycol) dimethacrylate,
5 di(propylene glycol) diacrylate, and trimethylolpropane triacrylate.

1 (15) A curable blend according to Claim 1 wherein the reactive component is a
2 compound substituted with long chain alkyl or alkoxy segments.

- 1 (16) A curable blend according to Claim 15 wherein the substituted reactive component
2 is a member selected from the group consisting of: alkoxyated nonyl phenol
3 acrylate and alkoxyated nonyl phenol methacrylate.
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1 (17) A curable blend according to Claim 1 wherein the reactive component is a
2 heterocyclic reactive organic compound.

1 (18) A curable blend according to Claim 1 wherein the heterocyclic compound is a
2 member selected from the group consisting of: n-vinyl pyrrolidone and methyl-n-
3 vinyl pyrrolidone.

1 (19) A curable blend according to Claim 1 further comprising a hydroxy functional
2 adhesion promoter.

1 (20) A curable blend according to Claim 19 wherein the hydroxy functional compound
2 is a member selected from the group consisting of hydroxyethyl methacrylate and
3 ethoxylated hydroxyethyl methacrylate.

1 (21) A curable blend according to Claim 1 further comprising a photoinitiator that
2 initiates free radical crosslinking upon exposure to light.

1 (22) A curable blend according to Claim 21 wherein the photoinitiator is a member
2 selected from the group consisting of (2,6-dimethoxybenzoyl)-2,4,4-
3 trimethylpentyl phosphine oxide, 2-hydroxy-2-methyl-1-phenyl-propane-1, 1-
4 hydroxy-cyclohexyl phenyl ketone, benzophenone and mixtures thereof.
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- 1 (23) A curable blend according to Claim 1 further comprising a ground state catalyst
2 that initiates free radical crosslinking upon exposure to heat.
- 1 (24) A curable blend according to Claim 23 wherein the ground state catalyst is a
2 peroxide.
- 1 (25) A coated substrate wherein the coating comprises a crosslinked composition
2 prepared from a homogeneous blend comprising:
3 (a) a 1,2-polybutadiene oligomer having a number average molecular weight
4 (Mn) of about 500 Daltons to about 50,000 Daltons,
5 (b) a bis-phenol-A derivative that is end-capped with acrylate functionality, and
6 (c) a reactive component that has at least one terminal double bond and that
7 enhances the compatibility between the 1,2-polybutadiene oligomer and the
8 bis-phenol-A derivative.
- 1 (26) A coated substrate according to Claim 25 wherein the 1,2-polybutadiene oligomer
2 has a number average molecular weight (Mn) of about 1,000 to about 5,000
3 Daltons.
- 1 (27) A coated substrate according to Claim 25 wherein the butadiene homopolymer is a
2 1,2-butadiene homopolymer.
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1 (28) A coated substrate according to Claim 27 wherein butadiene homopolymer
2 contains an amount of 1,4-polybutadiene.

1 (29) A coated substrate according to Claim 28 wherein the 1,4-polybutadiene is present
2 in an amount up to about 60% by weight, based on the weight of the polybutadiene
3 oligomer.

1 (30) A coated substrate according to Claim 25 wherein the 1,2-polybutadiene oligomer
2 is a copolymer.

1 (31) A coated substrate according to Claim 30 wherein the 1,2-polybutadiene copolymer
2 is prepared from butadiene and a vinyl monomer that is a member selected from the
3 group consisting of: styrene, vinyl acetate, divinyl benzene, isoprene, chloroprene,
4 alkyl acrylates, alkyl methacrylates, ethylene, propylene, butylene and mixtures
5 thereof.

1 (32) A coated substrate according to Claim 25 wherein the 1,2-polybutadiene oligomer
2 is present in the blend in an amount of about 5% to about 50% based on weight.

1 (33) A coated substrate according to Claim 25 wherein the bis-phenol-A derivative is
2 prepared from epichlorohydrin and bis-phenol-A.
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1 (39) A process for preparing a coated substrate comprising:

2 (a) obtaining a substrate with a clean surface,

3 (b) applying a coating to the substrate wherein the coating comprises a
4 homogeneous blend comprising:

5 (x) a 1,2-polybutadiene oligomer having a number
6 average molecular weight (Mn) of about 500 Daltons to about 50,000
7 Daltons,

8 (y) a bis-phenol-A derivative that is end-capped with
9 acrylate functionality, and

10 (z) a reactive component that has at least one terminal
11 double bond and that enhances the compatibility between the 1,2-
12 polybutadiene oligomer and the bis-phenol-A derivative, and

13 (c) exposing the homogeneous blend to radiant energy.

1 (40) A process for preparing a coated substrate according to Claim 39 wherein the
2 radiant energy is derived from a source which is member selected from the group
3 consisting of electron beam, ultraviolet, radiofrequency, infrared, and combinations
4 thereof.

1 (41) A process for preparing a coated substrate according to Claim 40 wherein the
2 substrate is a metal that couples in a radiofrequency induction field to generate heat
3 and initiate catalyst activity.
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- 1 (42) A process for preparing a coated substrate comprising:
- 2 (a) obtaining a substrate with a clean surface,
- 3 (b) applying a coating to the substrate wherein the coating
- 4 comprises a homogeneous blend comprising:
- 5 (w) a 1,2 – polybutadiene oligomer having a number average
- 6 molecular weight (Mn) of about 500 Daltons to about 50,000
- 7 Daltons,
- 8 (x) a bis-phenol a derivative that is end-capped with acrylate
- 9 functionality, and
- 10 (y) a reactive component that has at least one terminal
- 11 double bond and that enhances the compatibility between the
- 12 1,2 – polybutadiene oligomer and the bis-phenol-A
- 13 derivative, and
- 14 (z) a ground state catalyst that initiates free radical cross-
- 15 linking upon exposure to heat, and
- 16 (c) exposing the homogeneous blend to thermal
- 17 energy.
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- 1 (43) A process for preparing a coated substrate according to Claim 42 wherein the
- 2 homogeneous blend is exposed to both thermal energy and radiant energy.
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